

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO. 10/087,859
ATTORNEY DOCKET NO. Q68747

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (*Currently Amended*) A power supply circuit that generates a plurality of ~~for driving~~ liquid crystal display adapted to generate two or more drive voltages having intermediate voltage levels with respect to a peak voltage level, the intermediate voltage levels being grouped classified into a first group of voltage levels comprising intermediate voltage levels that are low level with respect to the peak voltage level and a second group of voltage levels comprising intermediate voltage levels that are high level with respect to the peak voltage level, said power supply circuit ~~for driving liquid crystal display comprising:~~

an amplifier having a voltage follower configuration;

at least one capacitor ~~one or more capacitors~~ connected to the amplifier, said at least one capacitor ~~capacitors~~ and said amplifier generating a first voltage level included in ~~being provided for each level of the first group of levels to generate a level in cooperation with each other for the first group of~~ voltage levels; and

a switch circuit ~~switching means controlled at a predetermined timing to~~ switch select a predetermined one of ~~said at least one capacitor~~ capacitors to generate a second voltage level included in the second group of voltage levels a level with a discharge voltage of ~~said at least one the capacitor and the peak voltage level for the second group of levels.~~

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2. (*Currently Amended*) A power supply circuit for driving liquid crystal display as claimed in Claim 1, wherein all voltage levels are generated with n number or less amplifiers of said amplifier and n number or less capacitors of the capacitors when the number of the voltage levels is equal to $2n$ for the intermediate voltage levels, wherein n is an integer.

3. (*Currently Amended*) A power supply circuit for driving liquid crystal display as claimed in Claim 1, wherein all voltage levels are generated with n number or less amplifiers of said amplifier and $3n$ number or less capacitors of said capacitors when the number of the voltage levels is equal to $4n$ for the intermediate voltage levels, wherein n is an integer.

4. (*Currently Amended*) A power supply circuit that generates four for driving liquid crystal display adapted to generate four drive voltages having intermediate voltage levels with respect to a peak voltage level, said power supply circuit for driving liquid crystal display comprising two amplifiers each having a voltage follower configuration, two series-connected capacitors, and a two-switching means, wherein the four intermediate voltage levels being classified into a first group of voltage levels comprises two intermediate voltage levels that are low level with respect to the peak voltage level and a second group of voltage levels comprises the remaining two intermediate voltage levels, wherein:

said amplifiers and said series-connected capacitors generate a level for the two voltage levels of the first group of voltage levels, and

said switching means, controlled at a predetermined timing, switch selects a predetermined one of said series-connected capacitors to generate a level the two voltage levels

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of the second group of voltage levels using with a discharge voltage from each of said capacitors
~~of the capacitor and the peak voltage level for the two levels of the second group of levels.~~

5. (*Currently Amended*) A power supply circuit ~~for driving liquid crystal display as~~
claimed in Claim 4, wherein said two capacitors are connected with each other via a junction,
wherein one intermediate voltage level of one level forming the first group of voltage levels and
one intermediate voltage level of another level forming the second group of voltage levels are
successively generated at the junction.

6. (*Currently Amended*) A power supply circuit that generates four ~~for driving liquid~~
crystal display adapted to generate four drive voltages having intermediate voltage levels with
respect to a peak voltage level, said power supply circuit comprising one amplifier having a
voltage follower configuration, at least three capacitors, and a three or four switching means,
wherein the four intermediate voltage levels being classified into a first group of voltage levels
comprises two intermediate voltage levels that are low level with respect to the peak voltage
level and a second group of voltage levels comprises the remaining two intermediate voltage
levels, wherein:

 said amplifier amplifiers and one of said capacitors generate a first voltage level included
in ~~for the one level of the first group of voltage levels, and~~

 said switching means, controlled at a predetermined timing, switches ~~said selects~~ a
~~predetermined~~ one of said capacitors to generate a voltage level included in the second group of

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voltage levels using with a discharge voltage of said the capacitor and the peak voltage level, and
said switching means, controlled at a predetermined timing, series-connects the remaining
capacitors to generate the other voltage level included in the second group of voltage levels using
discharge voltages of each of said remaining capacitors and the peak voltage level for the
remaining three levels of the second group of levels.

7. (*Currently Amended*) A power supply circuit for driving liquid crystal display as claimed in Claim 1, further comprising a segment electrode and a an additional capacitor that
stabilizes which is used to stabilize the voltage levels comprising forming the second group of
voltage levels to be a certain level available for being supplied to the segment electrode.

8. (*Currently Amended*) A power supply circuit for driving liquid crystal display as claimed in Claim 1, wherein said at least one the capacitor stabilizes the voltage levels or
capacitors used to generate have a function to stabilize the level, for the levels for the second
group of voltage levels.

9. (*Currently Amended*) A power supply circuit for driving liquid crystal display as claimed in Claim 1, wherein the timing is determined so as to be in synchronism with a display signal for a liquid crystal display and selection of said at least one capacitor capacitor(s) is
performed by said switch circuit switching means is timed so as to at a timing that does not affect
the liquid crystal display.

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10. (*Currently Amended*) A power supply circuit ~~for driving liquid crystal display~~ as claimed in Claim 9, wherein the display signal comprises either one of a frame signal, a data output signal, and a signal generated on the basis of the data output signal.

11. (*Currently Amended*) A power supply circuit ~~for driving liquid crystal display~~ as claimed in Claim 10, further comprising a common electrode and a segment electrode, wherein the connection of said at least one capacitor used to generate a level to be connected to the common electrode is controlled by a signal which is in synchronism with the frame signal and wherein the connection of said at least one capacitor used to generate a level to be connected to the segment electrode is controlled by a signal which is in synchronism with the data output signal.

12. (*Currently Amended*) A power supply circuit for driving liquid crystal display as claimed in Claim 1, wherein said predetermined timing connects is connected to said at least one capacitor capacitor(s) to generate a voltage level only during a certain switching period of switching the outputs and the predetermined timing connects said at least one capacitor is connected to a predetermined level to charge said capacitor outside of said switching period the capacitor(s) during the remaining period of time.

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13. (*Currently Amended*) A power supply circuit for driving liquid crystal display as claimed in Claim 1, wherein the first group of levels is configured with the levels on a low potential side and wherein said amplifier amplifier(s) and said capacitors capacitor(s) have a low withstanding voltage.

14. (*New*) A power supply circuit that generates four intermediate voltage levels with respect to a peak voltage level, said power supply circuit comprising one amplifier having a voltage follower configuration, three capacitors, and a switching means, wherein a first group of voltage levels comprises two intermediate voltage levels that are low level with respect to the peak voltage level and a second group of voltage levels comprises the remaining two intermediate voltage levels, wherein:

said amplifier and two of said capacitors generate the two voltage levels included in the first group of voltage levels, wherein an output voltage of said amplifier and a discharge voltage of one of said capacitors is used to generate a first output voltage level that is greater than the output voltage of said amplifier and said first output voltage charges an external capacitance; and

said switching means, controlled at a predetermined timing, switches one of said capacitors to generate a voltage level included in the second group of voltage levels using a discharge voltage of said capacitor and the peak voltage level, and said switching means, controlled at a predetermined timing, switches said external capacitance to charge another one of said capacitors for generating the other voltage level included in the second group of voltage levels.

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15. (*New*) A power supply circuit as claimed in Claim 14, wherein said amplifier and said capacitors have a low withstanding voltage.

16. (*New*) A power supply circuit for driving a display, comprising:
a first power source terminal;
a second power source terminal;
a first amplifier having its input coupled to said first and second power source terminals and its output coupled to a first intermediate voltage output terminal outputting a first intermediate voltage level;
a first capacitor having a first electrode and a second electrode;
a first switch electrically connecting said first electrode with one of said output of said first amplifier and said first power source terminal; and
a second switch electrically connecting said second electrode with one of said second power source terminal and a second intermediate voltage output terminal outputting a second intermediate voltage level.